Claims

What is claimed is:

1. An electro-optical device comprising:

a first substrate;

a second substrate opposite the first substrate;

a first driving electrode formed of a transparent conductive film on the first substrate;

a second driving electrode formed of a transparent conductive film on the second substrate; and

an electro-optical material layer including an electro-optical material sealed in a space demarcated by a sealing material between the first substrate and the second substrate,

wherein a light reflecting film, a color filter layer, an organic insulating film covering the color filter layer and protecting the color filter layer, and an inorganic insulating film covering substantially an entire surface of the first substrate, are sequentially formed between the first substrate and the first driving electrode, and

wherein a mounting terminal formed in a protruding region protruding from the second substrate, a first inter-substrate conducting terminal formed in a region overlapping the second substrate, and a wiring pattern for connecting the mounting terminal to the first inter-substrate conducting terminal are disposed on the first substrate,

wherein a second inter-substrate conducting terminal electrically connected to the first inter-substrate conducting terminal is disposed in a position opposite the first inter-substrate conducting terminal of the second substrate, with the sealing material therebetween,

wherein at least a partial region of the wiring pattern includes a metal film formed of the same metal material as the light reflecting film and having a side rising in a substantially vertical direction, and has a structure wherein the metal film, the inorganic insulating film, and a conductive film formed of a transparent conductive film formed of the same material as the first inter-substrate conducting terminal are sequentially disposed on the first substrate, and

wherein the side of the metal film is exposed from the inorganic insulating film, the conductive film extends from the corresponding region and contacts a corresponding side, and the first inter-substrate conducting terminal and the mounting terminal are electrically connected to the metal film through the conductive film making contact with the corresponding side and are electrically connected to each other through the metal film.

2. The electro-optical device according to Claim 1, further comprising:

an image display region, formed of a plurality of pixels, disposed to correspond to a region in which the first driving electrode and the second driving electrode overlap each other,

wherein part of the wiring pattern near the image display region is coated with the organic insulating film layer, and the mounting terminal and the first inter-substrate conducting terminal are exposed to the outside of the organic insulating film.

3. The electro-optical device according to Claim 1,

wherein, if the thickness of the metal film is a and the thickness of the inorganic insulating film is b, then $a/b > 5$.

4. The electro-optical device according to Claim 1,

wherein the thickness a of the metal film satisfies a > 100 nm, and the thickness b of the inorganic insulating film satisfies b < 20 nm.

5. The electro-optical device according to Claim 1,

wherein the wiring pattern has two or more portions in which the metal film and the conductive film are electrically connected to each other through the side of the metal film exposed from the inorganic insulating film.

6. The electro-optical device according to Claim 1,

wherein the portion of the metal film electrically connected to the conductive film through the side of the metal film has a comb shape.

7. The electro-optical device according to Claim 1,

wherein the wiring pattern includes a conductive base adhering layer formed under the metal film, and

wherein the portion of the metal film electrically connected to the conductive film through the side of the metal film is formed in an isolated island-shaped pattern.

8. The electro-optical device according to Claim 1,

wherein conductive particles for electrically connecting the first inter-substrate conducting terminal to the second inter-substrate conducting terminal are dispersed in the sealing material.

9. An electro-optical device comprising:

a first substrate;

a second substrate opposite the first substrate;

a first driving electrode formed of a transparent conductive film on the first substrate;

a second driving electrode formed of a transparent conductive film on the second substrate;

an electro-optical material layer including an electro-optical material sealed in a space demarcated by a sealing material between the first substrate and the second substrate,

wherein a light reflecting film, a color filter layer, an organic insulating film covering the color filter layer and protecting the color filter layer, and an inorganic insulating film covering substantially the entire surface of the first substrate are sequentially formed between the first substrate and the first driving electrode,

wherein a mounting terminal formed in a protruding region protruding from the second substrate and a wiring pattern for connecting the mounting terminal to the first driving electrode are disposed on the first substrate, and

wherein at least a partial region of the wiring pattern includes a metal film formed of the same metal material as the light reflecting film and having a side rising in a substantially vertical direction, and has a structure wherein the metal film, the inorganic insulating film, and a conductive film formed of a transparent conductive film formed of the same material as the first driving electrode are sequentially disposed on the first substrate, and

wherein the side of the metal film is exposed from the inorganic insulating film, the conductive film extends from the corresponding region and contacts a corresponding side, and the first driving electrode and the mounting terminal are electrically connected to the metal film through the conductive film making contact with the corresponding side and are electrically connected to each other through the metal film.

10. The electro-optical device according to Claim 9, further comprising:

an image display region, formed of a plurality of pixels, disposed to correspond to a region in which the first driving electrode and the second driving electrode overlap each other, and

wherein part of the wiring pattern near the image display region is coated with the organic insulating film layer, and the mounting terminal is exposed to the outside of the organic insulating film.

11. The electro-optical device according to Claim 9,

wherein, if the thickness of the metal film is a and the thickness of the inorganic insulating film is b, then $a/b > 5$.

12. The electro-optical device according to Claim 9,

wherein the thickness a of the metal film satisfies $a > 100$ nm, and the thickness b of the inorganic insulating film satisfies $b < 20$ nm.

13. The electro-optical device according to Claim 9,

wherein the wiring pattern has two or more portions in which the metal film and the conductive film are electrically connected to each other through the side of the metal film exposed from the inorganic insulating film.

14. The electro-optical device according to Claim 9,

wherein the portion of the metal film electrically connected to the conductive film through the side of the metal film has a comb shape.

15. The electro-optical device according to Claim 9,

wherein the wiring pattern includes a conductive base adhering layer formed under the metal film, and

wherein the portion of the metal film electrically connected to the conductive film through the side of the metal film is formed in an isolated island-shaped pattern.

16. The electro-optical device according to Claim 9,

wherein conductive particles for electrically connecting the first inter-substrate conducting terminal to the second inter-substrate conducting terminal are dispersed in the sealing material.

17. An electro-optical device in which an electro-optical material is interposed between a pair of opposed substrates,

wherein a metal film formed of a metal material having a side rising in a substantially vertical direction, an insulating film covering the metal film, and a

wiring line on a side of the metal film are sequentially disposed on one of the pair of opposed substrates, and

wherein the side of the metal film is exposed from the insulating film, and the metal film and the wiring line are electrically connected to each other through the side.

18. The electro-optical device according to Claim 1,

wherein the metal material includes at least one of silver alloy, aluminum alloy, and aluminum.

19. The electro-optical device according to Claim 9,

wherein the metal material includes at least one of silver alloy, aluminum alloy, and aluminum.

20. The electro-optical device according to Claim 17,

wherein the metal material includes at least one of silver alloy, aluminum alloy, and aluminum.

21. The electro-optical device according to Claim 1,

wherein the metal material has a two-layer structure of an upper layer formed of aluminum alloy or aluminum and a lower layer formed of a molybdenum film or a molybdenum alloy film.

22. The electro-optical device according to Claim 9,

wherein the metal material has a two-layer structure of an upper layer formed of aluminum alloy or aluminum and a lower layer formed of a molybdenum film or a molybdenum alloy film.

23. The electro-optical device according to Claim 17,

wherein the metal material has a two-layer structure of an upper layer formed of aluminum alloy or aluminum and a lower layer formed of a molybdenum film or a molybdenum alloy film.

24. An electrical wiring structure of a wiring pattern formed on a substrate,

wherein at least a partial region of the wiring pattern includes a structure in which an insulating film and a conductive film formed of a transparent conductive film are sequentially disposed on the substrate and a remaining region other than the partial region includes a structure in which a metal film formed of a metal material, the insulating film, and the conductive film are sequentially disposed on the substrate,

wherein the metal film has a side rising in a substantially vertical direction at a boundary between the partial region and the remaining region, and

wherein the side of the metal film is exposed from the insulating film, the conductive film extends from the partial region and contacts the side, and the metal film formed in the remaining region is electrically connected through the conductive film making contact with the side.